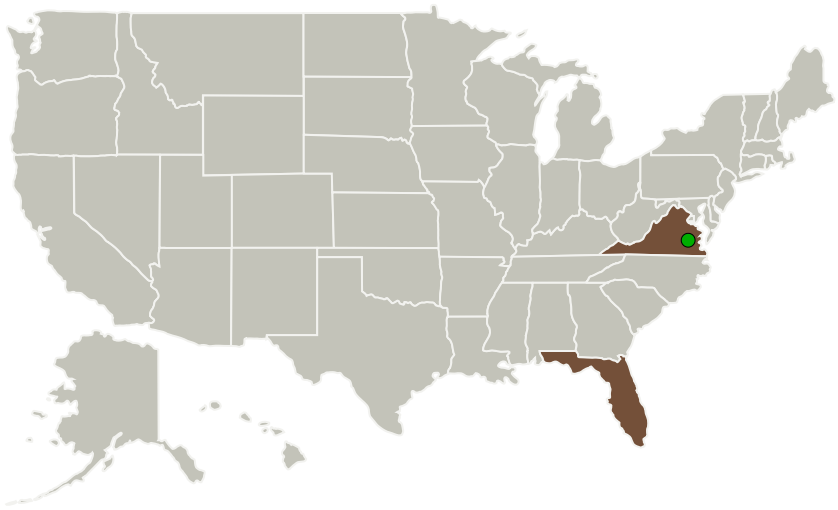
MEMS Skin Friction Sensor, Phase II

Completed Technology Project (2012 - 2015)

Project Introduction

Interdisciplinary Consulting Corporation proposes a sensor that offers the unique capability to make non-intrusive, direct, simultaneous mean and fluctuating shear stress measurement for subsonic and transonic test applications. Currently a standard for shear stress measurement tool does not exist. A precise silicon micromachined, differential capacitive, instrumentation grade sensor will facilitate skin friction measurement with high bandwidth, high resolution, and minimal sensitivity to extraneous inputs such as pressure. The proposed sensor possesses through wafer vias for backside electrical contacts to enable non-intrusive measurements in turbulent boundary layers. A robust and compact package with miniature interface electronics enables flush sensor mounting conformal with the surface. Circuit topology development for biasing and signal conditioning provides the ability to make simultaneous mean and dynamic shear stress measurement. The sensor performance will exceed its predecessors and set the standard for quantitative skin friction measurements. The simplicity of sensor design and an equally simple and proven fabrication technique allows for low cost, high performance skin friction sensors.

Primary U.S. Work Locations and Key Partners



MEMS Skin Friction Sensor Project Image

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Organizations Performing Work	Role	Type	Location
Interdisciplinary Consulting Corporation	Lead Organization	Industry	Gainesville, Florida
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Florida	Virginia

Project Transitions

April 2012: Project Start

March 2015: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137384)*

Images

Project Image
MEMS Skin Friction Sensor Project Image
(https://techport.nasa.gov/image/126060)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Interdisciplinary Consulting Corporation

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Tai-an Chen

Co-Investigator:
Tai-an Chen

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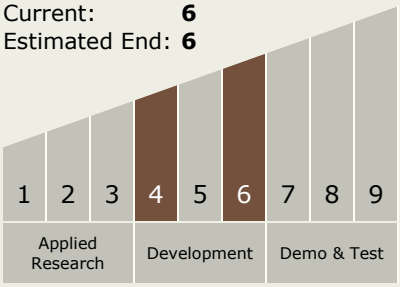
Technology Maturity (TRL)

Start: **4**
Current: **6**
Estimated End: **6**



Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.1 Aerodynamics

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System